

MR. TOYNBEE  
ON AN  
ARTIFICIAL MEMBRANA TYMPANI.



*With Mr. Taylor's compliments*

ON THE USE  
OF AN  
ARTIFICIAL MEMBRANA TYMPANI.

*Preparing for publication, by the same Author,*

A COMPLETE TREATISE

ON THE

DIAGNOSIS AND TREATMENT

OF THE

DISEASES OF THE EAR.

ON THE USE  
OF AN  
ARTIFICIAL MEMBRANA TYMPANI,  
IN  
CASES OF DEAFNESS,  
DEPENDENT UPON PERFORATION OR DESTRUCTION OF THE NATURAL ORGAN.  
TO WHICH IS ADDED A PAPER ENTITLED  
OUGHT THE TONSILS OR UVULA TO BE EXCISED IN THE  
TREATMENT OF DEAFNESS?

BY  
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ON

AN ARTIFICIAL MEMBRANA TYMPANI.

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It is well known that the partial or complete destruction of the membrana tympani affects, more or less, the power of hearing. In those cases where the orifice in the membrana tympani is small, and the mucous membrane of the tympanum continues healthy, but little inconvenience is experienced: when, however, the orifice is large, and the mucous membrane of the tympanum has become thickened, the capability of hearing is so much impaired that the patient is entirely excluded from the advantages of general conversation.

In the present paper I purpose to describe the results of my attempts to provide a remedy in cases of perforated membrana tympani, by the introduction of an artificial substitute for that important membrane. I shall divide the subject into the following sections:—

I. On the structure of the healthy membrana tympani.

II. On the functions of the membrana tympani, tympanum, and Eustachian tube.

### III. On the formation and use of an artificial membrana tympani.

#### I. ON THE STRUCTURE OF THE HEALTHY MEMBRANA TYMPANI.

In a paper published two years since<sup>1</sup> I demonstrated that the healthy membrana tympani consists of five laminae, which, commencing externally, are as follows:—

- A. The epidermis.
- B. The dermoid layer.
- C. The radiate fibrous layer.
- D. The circular fibrous layer.
- E. The mucous layer, with its epithelium.

A. The *epidermis*, as is well known, forms a *cul-de-sac* at the inner extremity of the external meatus, from whose surface it is easily removed by maceration.



(Figure 1.) In the course of dissecting, I have more than once observed this delicate epidermis to be the only layer remaining over portions of the membrana tympani, varying from a line to a line and a-half in circumference, and yet appearing sufficient to close the tympanic cavity, so as to render the power of hearing nearly perfect. The knowledge of the fact that this delicate layer is occasionally all that is left of the membrana tympani, ought to induce caution in the use of the syringe, as its application may cause a rupture of the epidermis.

<sup>1</sup> On the Structure of the Membrana Tympani in the Human Ear. (Phil. Trans., Part i., 1851.)



B. The *dermoid layer*, as its name implies, is continuous with the dermis lining the meatus, and it is situated between the epidermis and the radiate fibrous layer. It is extremely thin, and is the seat of the exquisite sensibility possessed by the membrana tympani; it also secretes the epidermis. (Figure 2.) The latter, previous to the publication of the paper just alluded to, was supposed to be secreted by the outer surface of the radiated fibrous layer; but there is now no doubt of the existence of the dermoid layer, which is more easily visible in cases of hypertrophy.<sup>1</sup>



C. The *radiate fibrous layer*—hitherto usually described, in conjunction with the circular layer, as “the fibrous lamina of the membrana tympani”—was wrongly considered by Sir Everard Home to be muscular. The fibres of this lamina are attached, externally, to a circular cartilaginous ring, which is received into a groove of the osseous meatus and centrally to the malleus. (Figure 3.) The most attenuated portion of this layer lies between the posterior part of the long process of the malleus, and the circumference of the organ. This lamina is continuous with the periosteum of the meatus.



D. The *circular fibrous layer* is attached to the radiate lamina by fine cellular tissue, and the two

<sup>1</sup> In the specimen from which figure 2 was taken, the dermoid layer was slightly hypertrophied. It is seen passing from the surface of the meatus, and in some degree concealing the malleus.

structures may be readily separated. It consists, as its name implies, of circular fibres, which are firm and strong at the circumference of the organ, but towards its centre become so attenuated as to require care in order to detect them. (Figure 4.) The strong fibres at the circumference form a complete circle, and are attached to each side of the body of the malleus, as well as to the sides of the upper third of the processus longus. The circular fibrous layer is continuous with the periosteum of the tympanic cavity.



E. The *mucous layer* lines the inner surface of the circular fibrous layer. Like the rest of the mucous membrane of the tympanum, it is very thin and delicate, and the epithelium covering it is composed of cells with cilia. It will be observed that of all the laminae composing the membrana tympani, none are proper to it, but they are continuations of other structures. (Figure 5.<sup>1</sup>)



In order to give a complete idea of the membrana tympani, it is desirable to add, in this place, a few words relative to the *tensor tympani ligament*. This structure is about three-fourths of a line in length, and is attached, internally, to the cochleariform process, and externally to the inner surface of the malleus at the junction of the long process with the neck.

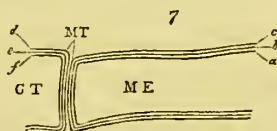
<sup>1</sup> a. The layer of the mucous membrane.  
 b. The circular fibrous layer.  
 c. The radiate fibrous layer.

The interior, which is tubular, forms a receptacle for the tendon of the tensor tympani muscle. (Figure 6.<sup>1</sup>) This ligament performs the important function of drawing the membrana tympani inwards, and thus, by antagonism with the circular and radiate fibres of the organ, which tend to draw the membrana tympani outwards, the organ is kept in a state of moderate tension, and adapted to be acted upon by the tensor tympani and stapedius muscles. In cases of apparently total destruction of the tympanic membrane, the ligament in question still performs the function of keeping the chain of ossicles in a due state of tension, drawing the malleus inwards at the same time that that bone is pulled outwards by the few fibres of the membrana tympani that happen to remain attached to the body of the malleus.<sup>2</sup>

<sup>1</sup> *a.* The tubular tensor tympani ligament.

*b.* The tensor tympani muscle, the tendon of which has been drawn upwards from within the tubular ligament.

<sup>2</sup> The accompanying diagram gives an idea of the relations of the several laminae of the membrana tympani.



*ME.* Meatus externus.

*MT.* Membrana tympani.

*CT.* Cavitas tympani. *a.* The epidermis of the external meatus.

*b.* The dermis of the external meatus.

*c.* The periosteum of the external meatus.

*d.* The periosteum of the tympanic cavity.

*e.* Mucous membrane. *f.* Epithelium.

## II. ON THE FUNCTIONS OF THE MEMBRANA TYMPANI, TYMPANUM, AND EUSTACHIAN TUBE.

During the present year, I have been engaged in some investigations into the functions of the membrana tympani and tympanic cavity, the results of which have been laid before the Royal Society in a paper.<sup>1</sup> In that communication I have shown that, contrary to the usually received opinion, the Eustachian tube does not remain always open, and that so far from allowing an uninterrupted communication between the cavity of the tympanum and that of the fauces, the guttural orifice is always closed except during the momentary action of swallowing.<sup>2</sup> In this latter case, the muscles of the Eustachian tube, the tensor and levator palati muscles, open the guttural orifice of the tube, afford free egress to the mucus secreted by the lining membrane of the tympanum, and allow air to enter or leave the tympanic cavity. The closure of the tube, excepting during the act of deglutition, can be experimentally proved. To those accustomed to descend in a diving-bell, it is well known that the unpleasant sensation in the ears, amounting sometimes to positive pain, is capable of instant removal by the act of swallowing, during which the condensed air being allowed to enter the tympanum and come in contact with the inside of the membrana tympani, the pressure on its outer surface is relieved by being counterbalanced. Again, if an attempt is made to

<sup>1</sup> On the muscles which open the Eustachian tube.

<sup>2</sup> Hyrtl and Wharton Jones had previously stated that the walls of the guttural portion of the tube are in contact.

swallow while the nostrils are closed by the finger and thumb, a sensation of fullness and pressure is experienced in the tympanic cavity, in consequence of air having been forced, during the act of deglutition, through the open tube into the tympanum; and this sensation continues until, by another act of swallowing, the tube is re-opened and the confined air escapes into the fauces. In the above paper an account was given of the muscles of the Eustachian tube in mammalia, birds, and reptiles; and in every animal examined it was quite apparent that the guttural orifice of the tube was closed excepting during muscular action. In some mammalia the tube is opened by the muscles of the palate; in others, by the superior constrictor of the pharynx. In birds there is a common membranous Eustachian tube, into which the osseous tubes open at the base of the skull, and this common tube descends between the two internal pterygoid muscles, to the internal surface of each of which the circumference of the tube is firmly attached by dense cellular tissue; and it is only during certain actions of these muscles that the tube is opened.

Having shown that the guttural orifice of the Eustachian tube in man and animals was closed, except during certain muscular actions, I next showed by a modification of Mr. Wheatstone's experiment, suggested to me by Mr. C. Brooke, that the sonorous vibrations communicated to the bones of the head appear much louder when the meatus is closed, than when its orifice is open. If, for instance, a tuning-fork be made to vibrate, and it be then placed in contact with



the head, the sound proceeding from it will, in a few seconds, cease to be heard; but if, directly on this cessation of sound, the experimenter close the entrance of the meatus in one ear, so as to convert it into a shut cavity, he will immediately hear a renewal of the sound of the tuning-fork; from which it appears most probable that the sonorous vibrations communicated to the external meatus impressed the membrana tympani much more powerfully when confined to the cavity of the meatus, than when allowed free communication with the external air. Considering the result of this experiment in connexion with the preceding fact of the ordinarily closed state of the tympanic cavity, it appeared to me highly probable that the sonorous vibrations imparted to the cavity of the tympanum, could only make their due impression on the membranes of the labyrinth, when strictly confined to the tympanic cavity and were not allowed to expend themselves in the cavity of the fauces. This conclusion was strengthened by the recollection that all the walls of the tympanic cavity appear constructed for producing resonance, having an investing mucous membrane of such tenuity as scarcely to be detected, save by the touch, or by the use of a magnifying glass, and also by observing that this peculiar condition of the mucous membrane was restricted to the tympanic cavity itself, and to that portion of the Eustachian tube which forms a portion of the resonant walls of the tympanic cavity.<sup>1</sup>

<sup>1</sup> In a paper published in the British and Foreign Medico-Chirurgical Review, No. 21, January, 1853, I have endeavoured to show that a

If the view here advocated be correct, and if, for the perfect performance of the function of hearing, it be necessary that the sonorous vibrations should be confined to the tympanic cavity, it is clear that the analogy usually cited as existing between the musical instrument, the kettle-drum, and the tympanum of the human ear, to the effect that in both, the air within should be allowed to communicate with that without, is incorrect; and it is also evident that an opening in the membrana tympani must, in a degree, diminish the power of hearing.<sup>1</sup> Upon the examination of patients affected with a simple perforation of the membrana tympani, this diminution in the ability to hear can, in fact, always be detected; although, as has been stated, if the orifice be small and the organ otherwise healthy, the difference is inconsiderable.

leading function of the membrana tympani, and the muscles and ossicles of the tympanum, is to act as the analogue of the iris in the eye. The tensor tympani muscle not only, as its name implies, renders tense the membrana tympani, but also compresses the fluids of the labyrinth, while the stapedius muscle has a directly opposite action in relaxing the membrana tympani, and in placing the contents of the labyrinth in a state to be affected by the most delicate sonorous undulations. The base of the stapes moves to and fro in the fenestra ovalis, as a piston in a cylinder. There is no doubt in my mind that the fenestra rotunda is the chief medium for the passage of these undulations to the labyrinth, for the chain of bones may be incomplete without the hearing power being affected to scarcely an appreciable extent. Another very important function of the membrana tympani is to form part of the resonant walls of the tympanic cavity.

<sup>1</sup> Müller has shown that for the production of sonorous undulations it is not requisite a small drum should have an orifice for the communication of the air within and that without; and Mr. C. Brooke states that such orifice is only required where the air is considerably displaced, which is the case only in the more simple vibrations of the membranes.

In the greater number of cases, however, where perforation of the *membrana tympani* has existed, other lesions of a serious character have accompanied it—as thickening of the mucous membrane of the *tympanum*; pressure on the membrane of the *fenestra rotunda*; derangement of the articulation of the stapes with the *fenestra ovalis*; or injury to the nervous expansion in the labyrinth. Under any of these circumstances, it occurred to me that as an orifice in the *membrana tympani*, by preventing the sonorous undulations from being concentrated upon the membranous labyrinth, owing to their diffusion in the *meatus*, might be the direct cause of the diminished power of hearing, so it was probable that increased power would be the result of an artificial stoppage of the orifice.

### III. ON THE FORMATION AND USE OF AN ARTIFICIAL MEMBRANA TYMPANI.

As a consequence of the preceding train of reflection, I was led to attempt the construction of an artificial *membrana tympani*, which it was hoped might serve as a substitute for the natural membrane, so far, at least, as its function of closing the *tympanum* and of rendering its walls resonant was concerned.<sup>1</sup>

<sup>1</sup> My hopes of success were strengthened by the result of some observations I had made upon cases of perforate *membrana tympani*. When these cases are not complicated with any other serious lesion of the organ, it must have been remarked, by others as well as by myself, that the patient, from some inexplicable cause, at times suddenly hears perfectly well, or nearly so. This improved hearing sometimes remains a few minutes only, at others for one or more hours. Having found this improvement to follow the use of a syringe and tepid water, or even of the pocket-hand-

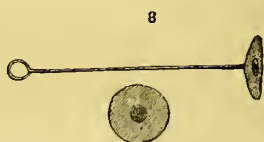


After some experiments I tried vulcanized india rubber and gutta percha, making use of the thinnest layers of them that were procurable. With both these substances I succeeded in making a rude kind of artificial membrana tympani, by cutting a portion about the size of the natural membrane, and passing through it a piece of thread, by means of which and a fine tube it could be passed down to its proper situation. The tube was then withdrawn, and the thread alone left in the external meatus, by which the artificial membrane could be withdrawn at the pleasure of the patient or the operator. The disadvantages attaching to this apparatus were, difficulty of applying it on the part of the patient; liability of the material to be torn by the thread; and unsightliness of the latter hanging down from the meatus. The experiment, however, was sufficiently satisfactory to induce me to request Messrs. Weiss to construct one, the centre of which should consist of two very fine plates of silver, having a diameter of about three quarters of a line, between which the layer of vulcanized india rubber or gutta percha might

kerchief, I examined the ear in certain patients, after these operations had been effected, and I found in the former case that a bubble of water, and in the latter of discharge, filled up the orifice in the membrana tympani. Upon destroying the bubble, the improvement in the hearing at once disappeared. In one patient I was able to keep up the improved hearing by the use, from time to time, of a solution of gum accacia in water. Upon reconsidering these facts, since I completed the observations upon the closed state of the tympanic cavity, I have arrived at the conclusion that the bubble of water, discharge, or mucilage acted beneficially by again confining the sonorous undulations to the tympanum, and this conclusion has been strengthened by subsequent observations. (See Appendix.)

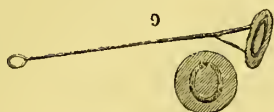
be placed, and to the outer surface of one of these plates a silver wire was to be attached. The artificial membrana tympani made by Messrs. Weiss, from these directions, has hitherto been perfectly successful. As supplied by them, the portion of vulcanized india rubber or gutta percha is about three quarters of an inch in diameter, which leaves sufficient margin for the surgeon to cut out a membrane of any shape that may seem to him desirable, and to leave the silver plate, either in the centre or towards the circumference, at his discretion.<sup>1</sup> (Figure 8.)

The silver wire is of sufficient length to admit of the membrane being introduced or withdrawn by the patient, but is not perceived externally except upon especial observation. A second kind of artificial membrane is made by fixing the layer of gutta percha or vulcanised india rubber between two very delicate silver rings from the eighth to the sixth of an inch in diameter; these rings are rivetted together, leaving a portion of the membrane drawn moderately tense in their centre; a margin of the membrane is also left beyond the circumference of the rings, so as to prevent the latter being in contact with and irritating the tube of the ear. To the surface of one of these rings the silver wire is fixed by two branches, and they should be joined so that the outer surface



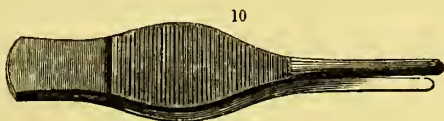
<sup>1</sup> The surgeon can bend the wire so as to make the outer surface of the membrane face obliquely outwards and forwards, like the natural organ.

of the rings should look obliquely outwards and forwards instead of directly outwards, thus imitating the direction of the natural membrana tympani. This kind of membrane is often preferable to that pre-



viously described, if the meatus is sufficiently large to admit of its passage. (Figure 9.<sup>1</sup>)

A pair of forceps is made whereby the artificial membrane can be more easily introduced and withdrawn. (Figure 10.)



Before proceeding to speak of the mode in which the artificial membrana tympani should be applied, it is necessary to premise a few words on the diseases which usually cause perforation or destruction of the natural membrane, and upon the condition of the structures which remain. The most frequent of these diseases is catarrhal inflammation of the mucous membrane lining the tympanic cavity. It is one of those usually styled otorrhæa, of which a more particular account will be found in the paper cited in the margin.<sup>2</sup> This disease generally follows an attack

<sup>1</sup> In some cases, however, it produces a loud noise as if it were too tense; it would, perhaps, be desirable to have it made with only one branch, so that the surgeon may be able to alter the angle of the membrane with the stem, according to the case.

<sup>2</sup> On the Nature and Treatment of those Diseases of the Ear which have hitherto been designated Otorrhæa and Otitis. Transactions of the Provincial Medical and Surgical Association, vol. xviii. 1851.

of scarlet fever, scarlatina, measles, or any ordinary cold, and it usually occurs in children having a tendency to enlargement of the glands. The tympanic mucous membrane becomes thickened, and secretes so large a quantity of mucus of so viscid a character, that it cannot escape through the Eustachian tube; consequently, it gradually distends the tympanic cavity and presses upon the inner surface of the membrana tympani, a portion of which, generally posterior to the malleus, begins to ulcerate, and an aperture is at length produced, through which the mucus exudes into the external meatus. This orifice is in some cases not larger than a small pin's head, in others it is a line in diameter, while in many cases the entire membrane is destroyed, with the exception of a margin at the circumference about half a line in diameter, which, being composed of the combined fibres of the thickest portion of the circular and radiate laminae, generally remains. This margin is deepest at the upper part. In some rare cases, the long process of the malleus continues entire after the complete destruction of the membrane to which it was attached; but, as a general rule, the whole of this process is gradually absorbed, leaving merely the head of the bone which articulates with the incus, the neck, and the body which receives the attachment of the tensor tympani ligament internally; anteriorly and posteriorly the fibres of the remnant of the membrane are attached, and externally the processus brevis remains. It will therefore be understood that, in cases of so-called destruction of the membrana

tympani, a margin is generally left, to which the body of the malleus remains fixed, and to the inner part of which the tensor tympani ligament and muscle are attached, affording the means by which the small bones and muscles of the tympanum are still enabled to perform their functions. In cases of general *ulceration* of the mucous membrane of the tympanum, which fortunately seldom occurs, the incus is generally discharged, and sometimes the malleus also; but even in these cases, if the attachments of the stapes to the circumference of the fenestra ovalis remain uninjured, the power of hearing may be much improved: should the stapes however be removed, total and irremediable deafness ensues.

The other disease through which an orifice in the membrana tympani is usually effected, is *ulceration of the fibrous laminæ*. The disease itself is commonly the result of inflammation of the dermoid layer, which spreads first to the radiate fibrous and thence to the circular lamina. The laminæ, being weakened by the ulcerative process, fall inwards as far as the promontory, to which they often ultimately adhere, and, when an orifice has been thus produced, its margins are not unfrequently drawn into the shape of a funnel, whose inner part adheres to the tympanic walls. In ulceration of the membrana tympani, proceeding from the dermoid layer, the entire organ is very rarely destroyed, but an orifice merely is produced.

The cases in which the artificial membrana tympani is of the greatest benefit are those where there



is a well defined aperture in the natural membrane, or, if it be entirely absent, where there is simple hypertrophy of the mucous membrane of the tympanum, with or without discharge from its surface. In these cases, it will be found that the organ has by no means entirely lost its power of discerning sounds; as a general rule, the human voice is heard when the mouth of the speaker is situated within about a foot of the patient's ear, and when the words are spoken slowly and distinctly. The diminished power of hearing just noticed, while it entirely excludes the sufferer from the advantages of general conversation, is, however, greatly aggravated when, to the affection of the membrana tympani and mucous membrane of the tympanum, the stapes has become ankylosed to the fenestra ovalis, or the nervous expansions have been injured. In such cases where the patients require to be shouted to close to the ear, the artificial membrane will not prove of any service.

*The Mode of Applying the Artificial Membrana Tympani.*

As in cases of perforation or destruction of the membrana tympani there is so frequently catarrhal inflammation of the mucous membrane of the tympanum, it is obviously important that no foreign substance should be placed in contact with that membrane; and, as there is always a margin of the membrana tympani remaining, the object of the Surgeon should be to keep the artificial membrane external to the latter. After carefully noting the

size of the inner extremity of the meatus to which the natural membrana tympani was attached, the operator should then cut the artificial membrane as nearly of the size and shape of the natural one as possible, taking care at the same time to keep the margin quite smooth and regular.<sup>1</sup> The patient must then be placed with the head inclined to the opposite shoulder, while a strong light is thrown into the meatus, which if liable to discharge should have been previously syringed. The operator will now take the artificial membrane, and, having moistened it with water, pass it, by means of the silver wire, gently inwards, until it has reached what he considers the natural position. This he will ascertain by the occurrence of a faint bubbling sound, caused by the escape of the slightly compressed air beyond it; he will also feel a slight obstruction offered to its further passage by the remnant of the natural membrane. Should he attempt to pass the artificial membrane beyond this point, the patient will complain of pain, which until then had not been felt. The most certain test, however, of the artificial membrane having been properly placed is the sensation of the patient, who discovers, by the sound of his own voice, or that of the Surgeon, or by the movement of his tongue and lips, that his hearing has been suddenly much improved.

It will be imagined that great care must be taken to cut the membrane so that it shall fit the inner ex-

<sup>1</sup> In cases where only a small border of the natural membrane remains, it is often desirable to cut the artificial membrane of a size larger than the inner extremity of the tube, so that its edge may turn outwards.

tremitry of the meatus with exactness, since if too large it would cause discomfort, and if too small it would not fulfil its purpose of rendering the tympanum an air-tight cavity. It is not easy, in all cases, to fit the artificial membrane exactly to the inner extremity of the meatus, so as not to allow of any communication between the air in the tympanum and that in the external meatus; this is, however, the object which should always be sought to be attained. At first, the patient should be instructed not to use the artificial membrane for more than two hours daily; and, if he complains of an uncomfortable feeling, one hour, or even half an hour, will be sufficient.

It would, perhaps, be expected that the contact of a foreign body, like the artificial *membrana tympani*, with the wall of the external meatus would soon become intolerable; such, however, is not the case, and several patients have left my room without being able to say, from the sensation in the ear, whether any foreign body were there; many have now worn this apparatus daily, during several months, without having suffered the slightest pain. The explanation of this circumstance may be found in the fact that the most sensitive part of the meatus externus is about its centre, the membrane in the immediate vicinity of the *membrana tympani* not being so abundantly supplied with nerves: another explanation is that the circumference of the artificial membrane presses with extreme gentleness against the wall of the meatus.

The results of the application of the artificial organ



have been much more satisfactory than I had reason to anticipate. I have already used it beneficially in nearly fifty cases. The substitution of a thin layer of vulcanized India rubber or gutta percha, for so exquisitely delicate a structure as the healthy membrana tympani, would be expected to afford but trifling aid; such, however, is not the case, for among the patients relieved by it most have heard the human voice perfectly across an ordinary sized room, and in one case the voices of boys in the open air were heard at a distance of between one and two fields. Surgeons, who have paid careful attention to diseases of the ear, will not be surprised at the efficient substitute the artificial membrane offers, as they will bring to mind many cases in which the natural organ has been greatly hypertrophied, especially in chronic inflammation of its dermoid layer, with but a very slight diminution of the power of hearing.

The surgeon having ascertained that the artificial membrane is beneficial to the patient, if no pain is experienced, it may be allowed to remain in the ear for a few hours, and gradually increased to the whole day: it is often desirable that the use of the membrana tympani should be preceded, or accompanied, by vesication over the mastoid process, whereby the thick mucous membrane of the tympanum may be rendered more healthy. In all cases, the artificial membrane should be removed at night, and, when there is any discharge, the ear ought to be syringed each night and morning with tepid water.

## C A S E S.

CASE I. *Deafness for sixteen years, discharge from each ear for six years, aperture in each membrana tympani ; power of hearing restored.*

Peter Turnbull, æt forty-three, formerly in the army, from which he was discharged on account of his deafness, was admitted, under my care, at St. Mary's Hospital on the 12th of January, 1852. He stated that sixteen years ago, without any other assignable cause than a cold, he became slowly dull of hearing, and five or six years since he perceived a discharge from both ears, which has continued up to the present time. The power of hearing has been gradually diminishing, so that, at present, he requires speaking to loud, close to his head. Upon examination, an aperture between one and two lines in diameter was observed in each membrana tympani, and the mucous membrane of the tympanum, which was the source of the discharge, was more thick and red than natural.

The treatment consisted in keeping up counter-irritation over each mastoid process, and in the use of an injection composed of three grains of acetate of zinc, to an ounce of water. Under this treatment, he somewhat improved, but the hearing still remained so defective

that he was precluded from following any avocation. In the commencement of June, I experimented on this patient with the first artificial membrana tympani composed of vulcanized India rubber, and the good effect was at once decided. When it was placed over the surface of the original membrane, so as wholly to close the orifice, the patient made a movement of his lips, and said, "I hear as differently as possible from what I have done for many years; everything sounds clear!" This patient went away with the artificial membrane in his ear, hearing conversation perfectly. The following morning, he came to my house, saying that he had accidentally moved what I had left in his ear, and that he was "as dull as ever." I replaced the artificial membrane—he again heard well—and, being supplied with one which he could introduce or remove at pleasure, he has worn it, during the day, ever since, a space of between three and four months, and he has never complained of pain or discomfort from it. Latterly, he has found the hearing so much improved that he has been able to dispense with the use of the artificial membrane for a few hours daily; but he hears much better with than without it. As a proof of the great amelioration that has taken place, this patient told me that while in the country lately, and using the membrane, he heard voices at a distance, and upon going towards the place from which they appeared to proceed, he found some boys under a hedge, more than a field distant from the spot where he heard them. He is going back into the army.

This patient was shewn at a meeting of the Patho-



logical Society of London, in February, 1853; the following is the published report:—"The artificial membranes having been removed, the members of the Society had the opportunity of observing the perforate condition of each membrana tympani. After the removal of the membranes, he could not hear, unless loudly spoken to; but, when he had replaced them, which he did with apparent readiness, his hearing was excellent."—*Medical Times and Gazette*, February 12, 1853.

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CASE II. *Catarrhal inflammation of the mucous membrane of the tympanum; destruction of the right, and perforation of the left, membrana tympani. Hears conversation perfectly by means of the artificial membrana tympani.*

Miss A. H., æt seventeen, pale and delicate, consulted me on the 15th of April, 1852, on account of so serious a diminution of the power of hearing, that she could distinguish voices only when spoken in a loud tone close to the ears. It was stated by her mother, who accompanied her, that at four years of age she had an attack of ear-ache, which was followed by considerable dulness of hearing; three years since, discharge was observed to issue from the right ear, and this has occurred at intervals ever since. About two months ago, after a severe cold, the dulness of hearing became much increased, and has remained so to the present period. Upon examination of the right ear, the membrana tympani was found to have been

entirely destroyed by ulceration, excepting a small portion, superior to which the uppermost part of the handle of the malleus was attached, the lower portion having been entirely removed. The incus and stapes were present, and the mucous membrane of the tympanum was much thicker and more red than natural. In the left ear, there was an aperture in the membrana tympani, about a line in diameter, and the tympanic mucous membrane was also thick. There was a small quantity of adhesive mucous discharge in each tympanic cavity and external meatus. The plan of treatment adopted in this case consisted in applying over each mastoid process, every night, a small portion of vesicating paper, and in using an injection twice a day of a solution of acetate of zinc, three grains to an ounce. Under this treatment, the power of hearing somewhat improved, and the discharge was greatly diminished, but there was still considerable difficulty in hearing the voice, and she remained in this state until the end of June, when I applied an artificial membrana tympani to each ear, the beneficial effect of which was decided and instantaneous, the patient being able to hear my voice across the room. Upon seeing her again on the 10th of July, the report was that "she heard quite well; she does not require to be spoken to louder than other persons, and she has been to a concert where she heard every note perfectly." On the 17th of July, she said that "she now hears all that is said in a room; at church, she has heard the whole of the sermon, which she had not done for many years." There was no complaint of pain from



the use of the instrument; she takes it out every evening and replaces it in the morning, with the greatest facility, and “she finds that she hears better without it than before its use.”

As this patient was about to visit the sea-side, I requested her to call upon my friend, Mr. Hoffman, one of the surgeons to the Seabathing Infirmary, Margate. He wrote, in the middle of August, the following particulars respecting the case:—“The difference in her hearing, when she wears the artificial tympanum and without it, is not now very marked, but she says that it was much greater. Possibly the wearing it has allowed the irritation of the external air to have less effect on those parts of the internal ear to which nature did not intend it to have free access, and that these parts have regained their normal state to a certain degree, and therefore the hearing without the artifice has improved nearly up to the point that has been reached with its aid. This would tell well for it; at all events, it is a capital cure.”

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CASE III. *Ulceration and perforation of each membrana tympani, attended by discharge from the mucous membrane of the tympanum; hearing much improved.*

Emma Prothrough, æt twenty-one, was admitted at St. Mary's Hospital on the 24th of June, 1852. She stated that, six or seven years ago, she became slowly dull of hearing after an attack of cold, and she has been gradually getting so bad that, at the present time, she cannot hear voices unless she is

spoken to loud, near to her. She has had a slight discharge from each ear, at different times, during the late few years, and this has been constant for four months. The power of hearing varies much, but it is generally least strong in an evening. On examination, I found a circular orifice in the anterior and inferior part of each membrana tympani about half a line in diameter, through which the mucous membrane of the tympanum was observed to be red and thick, an adhesive discharge having been removed from the tympanic cavity. In this case, similar treatment to the last was pursued, so as to reduce the inflammation of the mucous membrane; an artificial membrane was then applied, which I placed against the outer surface of the original organ to which it adhered, and perfectly closed the orifice. The effect upon this patient was quite as satisfactory, and she heard her own voice and that of those in the room perfectly well.

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CASE IV. *Polypus in each ear; perforation of the right membrana tympani; hearing much improved.*

Ellen Miller, æt fifteen, pale and not strong, was admitted under my care at St. Mary's Hospital, on the 14th of June, 1852. It was stated by her mother that four years previously she suffered from an attack of scarlet fever, since which she has had a discharge from each ear, and the power of hearing has gradually diminished until at the present time she requires speaking to in a raised voice close to her. She complains of frequent attacks of pain in the temples and

back of the head. Upon inspection, a vascular polypus was detected in each external meatus close to the membrana tympani. With the *right ear* the watch was heard only when in contact *with the left*, at a distance of two inches. By means of the lever forceps, the polypus was removed from each ear, and in the right membrana tympani a large orifice was detected. On the 16th of August, an artificial membrane was applied over the remaining portion of the right membrana tympani, the immediate result being, as she said, that "she heard very well; everything sounded better." August 19. Still continues to hear well—says that "all her friends at once found out her improvement"—has had no pain, only a slight sensitiveness. August 26. States that when the membrane is removed she hears better than she did. She wears the membrane the whole of the day, and she has not been prevented from the daily use of it, although the ear has felt tender.

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CASE V. *Perforation of the left membrana tympani; great hypertrophy and rigidity of the right; hearing of left ear much improved.*

David Lewis, a sailor, æt thirty-eight, was admitted at St. Mary's Hospital on the 26th of August, 1852. He stated that five years since he took a bad cold, which was succeeded by a discharge from each ear, during three or four days, which then disappeared. Since that period, he has been so hard of hearing as to require to be spoken to in a loud voice near him. On



inspection, the membrana tympani of the right ear was observed to be thick and white, and its surface uneven. In the left ear, there was an orifice in the membrana tympani, measuring about a line in diameter. I at once applied the artificial membrane to the right ear, and then turned away from the patient to a gentleman present and explained to him the principle upon which it was used. While talking, I observed the patient placing his finger over his right, the better, ear; and, when I had finished my remarks, he said: "I have heard all you have been saying with my bad ear, which has not been of any use to me for many years." August 30. Has worn the artificial membrane daily, and hears conversation very well.

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CASE VI. *Deafness in both ears after Scarlet Fever twelve years previously ; general conversation heard perfectly with the artificial membranes.*

Miss C., æt twenty-one, applied to me on March 1, 1853. At nine years of age, had an attack of scarlet fever, since which has had discharge from both ears, and has been so hard of hearing as generally to require to be spoken to in a loud voice within a yard. Until the last year, has experienced variations; for instance, she would hear better during a part of the day, the improved hearing being preceded by a sensation "as if something had cleared away." Since a cold about ten months ago there have been no changes for the better. Lately she has been galvanized, but without deriving any benefit. Upon examination I

found that in each ear the membrana tympani was absent; the ossicles remained; the mucous membrane of the tympanum was much thicker than natural, and was covered by a slight quantity of discharge. The watch was heard when pressed upon the right ear, and at the distance of half an inch from the left. I at once introduced an artificial membrana tympani, when the hearing was so much improved that the patient heard my voice, when speaking in an ordinary tone, across my room; once or twice the membrane, not being well fitted, slightly shifted its position, and she became as deaf as before until it was properly replaced. April 4. Has worn the artificial membrane regularly and has heard very much better, especially lately. Can hear me without difficulty across my room. April 26. Hears all that is said in a room.

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CASE VII. *Deafness since a child in the left ear from Scarlet Fever, accompanied by a sensation of vacaney in the head. Hearing restored and head symptoms removed.*

Miss B., æt twenty-five, consulted me on September 8, 1852. When a child, she had an attack of scarlet fever which rendered her left ear almost useless, and it has ever since remained so. The hearing power of the right ear was not diminished. A greater source of discomfort than the want of power in the left ear was a constant sensation of vacaney and confusion in the head. Upon examination, the whole of the left membrana tympani was found to have been destroyed; the

long process of the malleus, however, remained. The mucous membrane of the tympanum was thicker than natural. Upon the application of the artificial membrana tympani, this patient heard conversation as well with the affected as with the right ear; the sensation of vacancy in the head at once disappeared, and the ear felt quite comfortable. This patient was seen once or twice after the application of the membrane, and the report each time was that the ear and head were quite comfortable and the hearing quite good.

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CASE VIII. *Injury of the right ear by a fall when a child, followed by deafness; power of hearing restored by the artificial membrane.*

J. A. A., Esq., æt twenty-two, came to me on March 18, 1853. His history is that when a child he had a fall followed by discharge from the right ear; eleven years since, when in India, he complained of pain in the right ear followed by discharge; since which time he has occasionally had similar attacks of pain succeeded by discharge. At the present time, the right ear is not of much use, as he is obliged to turn the opposite ear to catch words. Upon examination, an orifice, about a line and a half in diameter, was observed at the anterior and superior part of the membrana tympani; the mucous membrane of the tympanum seen through it was red and more thick than natural. An artificial membrana tympani was applied so as to close the aperture in the natural organ and the power of hearing was at once greatly

improved. April 1. Has continued to wear the artificial membrane, and thinks that he hears quite as well as with the left ear.

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CASE IX. *Scarlet Fever at six years of age, entirely destroying the power of the left ear, and rendering the right almost wholly deaf. Right ear greatly improved by the artificial membrane.*

Miss C., æt fifteen, was brought to me by Dr. Ogier Ward on the 27th of January, 1853. Nine years previously, subsequent to an attack of scarlet fever, had copious discharge from each ear, which has remained until now. The ossicles have come away from the left ear. Since the fever, the left ear has been entirely useless, and she has been so deaf with the right as to require speaking to in a loud voice into the right ear. Upon examination, the absence of the membrana tympani in each ear was observed, and the mucous membrane of the tympanum was very thick and red. On account of the considerable amount of congestion of the mucous membrane, I thought it advisable to have each ear syringed with a mild astringent lotion, and to keep up a gentle counter-irritation over the mastoid process. The patient went to school at Brighton, where she was shortly afterwards seized with an attack of measles, during which her medical attendant, Mr. Whitehouse, found she was so deaf that he did not attempt to make her hear. In the middle of March, I saw her at Brighton, and found her so deaf that I had great difficulty in making

her hear my voice with the right ear; the left was useless. There remained considerable congestion of the tympanic mucous membrane and a copious discharge. I, notwithstanding, resolved to try the effect of the artificial membrana tympani, and, having syringed the right ear, it was introduced. The instant this was done, the patient's expression changed to a smile, and she said, "I hear all your voices;" and we found that she could hear distinctly everything that was said at a distance of a yard from her. Some days after, Mr. Whitehouse having visited her, while she was wearing the artificial membrane, wrote to me, saying, "Miss C. really heard me marvellously yesterday at the distance of nearly a yard, without raising my voice in the slightest degree." A subsequent letter, on the 12th of April, from the same gentleman confirmed this favourable account.





# OUGHT THE TONSILS OR UVULA TO BE EXCISED IN THE TREATMENT OF DEAFNESS?<sup>1</sup>

BY

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I feel that the surest way for a medical man to support his own dignity and that of his Profession, is to search perseveringly after the truth, turning neither to the right hand nor to the left, but laying the results of his labours before competent medical or scientific tribunals. I have always endeavoured to pursue this course, and when urged to expose the fallacy of some nostrum, or the absurdity of some novel procedure in reference to the diseases of the ear, I have declined to do so, from the conviction that the most effectual mode to extinguish error is not so much by attacking it, as to throw upon it the light of truth, under which it must inevitably wither and die; and as empiricism was driven out of its former stronghold, the department of diseases of the eye, when those diseases were studied earnestly by scientific men, so likewise will aural surgery stand out honourably when investigated with patience and zeal. Nor should I now deviate from the course I have hitherto pursued in wholly abstaining from personal controversy, did I not feel it my imperative duty to the Profession and the Public to remain silent no longer.

In a paper lately read before the Royal Medical and Chirurgical Society, on the Diagnosis and Treatment of Diseases of the Eustachian Tube, I took the opportunity of impressing upon the members the importance of the fact, that "enlarged tonsils are never the cause of obstruction in the Eustachian tubes." Mr. Yearsley, in a letter in the *Medical Times and Gazette*, of April 23, unhesitatingly denies the accuracy of

<sup>1</sup> Reprinted from the *Medical Times and Gazette*, May 14.

my statement, and he takes occasion again to advocate the operations on the tonsils and throat, which he says he has performed more than three thousand times. Feeling convinced that such operations have been productive of the most calamitous results, and that my silence now would be construed into a tacit admission of their propriety, I submit the following observations respecting them.

Mr. Yearsley advocates the excision of the tonsils, uvula, or portions of the palate in *four* distinct classes of cases, which I will examine separately.

*The first class consists of those cases where the tonsils "press upon the mouths of the tubes so as to cause obstruction or occlusion."*<sup>1</sup>

An opinion formerly obtained a certain amount of credence in the medical Profession, that enlarged tonsils can press upon and close the faucial orifices of the Eustachian tubes. There can be no doubt that this opinion was erroneous. In order to convince himself that it is so, the surgeon needs only to make an examination of the relative position of the tonsil and of the trumpet-shaped extremity of the Eustachian tube; he will find the tonsil situated from an inch and a quarter to an inch and a half below the tube; he will find the tonsil placed between the arches of the palate, the palato-glossus, and palato-pharyngeus muscles, the latter muscle separating the tonsil from the tube; and he will find the Eustachian tube above and behind close to the base of the skull, against the basilar process of the occipital bone, and surrounded by the tensor and levator palati muscles, the office of which I have recently shown in a paper read before the Royal Society,<sup>2</sup> is to open the tube during the act of swallowing; at all other times the tube is closed, and the tympanum is a shut cavity. Repeated examinations have convinced me that even should the tonsil enlarge to its greatest possible and known extent, *it never reaches the Eustachian tube*; for, with the enlargement of the tonsil, the palato-pharyngeus muscle also hypertrophies, and effectually separates it from the tube; that, as a general rule, the Eustachian tube can be shown to be pervious by the observer listening to the patient's ear with the otoscope while the patient swallows some saliva with the mouth and nares closed, (that when the tube is obstructed, this obstruction depends upon the thickening of its own lining membrane) and that the deafness, thought to be attributable to the enlarged tonsil, arises usually from a co-existent thickening of the

<sup>1</sup> Yearsley on Throat Deafness, page 4.

<sup>2</sup> On the muscles which open the Eustachian tube.



mucous membrane of the tympanum. I do not stand alone in the opinion here expressed. I feel confident that the intelligent members of the Profession fully agree with me. Kramer, in his *Treatise on the Diseases of the Ear*, translated by Dr. Bennett, and published so far back as the year 1837, says, at page 237, "I altogether deny the connexion of closure of the Eustachian tube with enlargement of the tonsils. I have frequently seen this enlargement, both with and without the least dulness of hearing, but always with the Eustachian tubes perfectly free. I confess that I cannot at all comprehend how swollen tonsils should press together the mouth of the Eustachian tube, and close it against the admission of air; and may assert that none of the practitioners who have admitted such mechanical effects, have ever satisfactorily investigated, by means of the catheter, the closure of the Eustachian tube, in any one single case of the kind. This reproach applies even to Itard. From his very defective method of investigation he ought not to have been surprised that so frequently no amelioration of the dulness of hearing occurred in those cases in which he attempted to cure it by excision of the tonsils." Mr. Harvey, who has written a book to demonstrate, not only the uselessness, but also the very injurious effects arising from excision of the tonsils, has arrived at the conclusion "that the enlarged tonsil or elongated uvula does not, *per se*, give rise to imperfect hearing."<sup>1</sup> But it is useless to quote further authorities against this view, for Mr. Yearsley's own words are a sufficient refutation of it. He says, (*Medical Times and Gazette*, April 23, 1853) "I saw cases of very large and projecting tonsils, and no deafness. I saw other cases, with thickening *about the region* of the tonsils, and I passed in my finger to feel between the arches for the condition of the glands, and they were frequently found enlarged and stealing upwards *towards* the mouths of the Eustachian passages. Thus it was that I arrived at the conclusion that enlarged tonsils did sometimes produce deafness, and upon this idea I proceeded to act."! Mr. Yearsley then sums up his conclusion "that occlusion of the tube does occasionally arise from the presence of an enlarged tonsil." Now, I ask any anatomist or surgeon whether Mr. Yearsley has adduced a particle of satisfactory evidence in favour of the position, that the Eustachian tubes are ever pressed upon by enlarged tonsils; is it not, on the contrary, most palpable, from his own words, that, with all his anxiety to do so, he

<sup>1</sup> On the Enlarged Tonsil, page 21.

can bring forward no proof in support of his position. But, supposing him to believe that the Eustachian tube is pressed upon "occasionally" by an enlarged tonsil, and that deafness is thereby produced, much mischief might not result from his "occasionally" excising a portion of the hypertrophied gland.<sup>1</sup> My own opinion, however, is that the excision may generally be dispensed with except in extreme cases; that it should be resorted to only where the health evidently suffers from the enlargement, and where the tonsils interfere with the functions of respiration or deglutition. I have seen cases where the tonsils have nearly touched in the median line, but where they were reduced, and the deafness cured, by general remedies and topical applications, and they subsequently assumed a size no larger than normal. But, if Mr. Yearsley believes that occlusion of the Eustachian tube only "occasionally" takes place from the pressure of an enlarged tonsil, how has it happened that his experience in tonsil-cutting has exceeded three thousand operations?<sup>2</sup> And I am thus brought to the second division of my subject.

*Secondly, Mr. Yearsley advocates the excision of the tonsils in cases "in which no obstruction to the Eustachian tube could be supposed, but where the improvement of the hearing could be explained in no other way than by supposing it to depend on an improvement caused in the mucous membrane of the throat, which in its turn improved the state of the ears."*<sup>3</sup>

In page 9 of the same brochure, it is asserted, that two-thirds of all cases of deafness arise out of morbid conditions of the mucous membrane of the ear; allusion is made, in proof of this assertion, to 2,000 cases treated in public and private practice. Then comes the following passage:—"In 120 dissections of deaf cases, the aural mucous membrane was diseased in no less than 91 cases, or upwards of three-fourths of the number examined." This reads as if the dissections were by the author of the pamphlet; but they are evidently those published by myself, in the second

<sup>1</sup> I have no doubt that in the very small number of cases of deafness benefited by the excision of the tonsils, the temporary relief that has been afforded has arisen from the diminution of the congestion of the mucous membrane of the Eustachian tube.

<sup>2</sup> His words are:—"What Mr. Toynbee's experience may be in tonsil-cutting I know not, but I may state that my own has extended over many years, and has exceeded 3,000 operations."—*Medical Times and Gazette*, April 23.

<sup>3</sup> On Throat Deafness, page 14.

series of Researches into the Pathology of the Ear, published in the 25th Volume of the "Medico-Chirurgical Transactions," 1843, and they are cited by Mr. Yearsley as "a remarkable corroboration of the novel views of the nature and treatment of deafness previously developed by him on various occasions." Now, it is right to state, that, instead of "120 dissections of deaf cases," they were the dissections of 120 ears, of which only two were from a person known to be deaf. It is true, that, in 91 specimens, a greater or less derangement of the mucous membrane of the tympanum was present, but which it is absurd to imagine could have been affected by tonsil-cutting. In what way, for example, could this operation influence the membranous bands connecting together the ossicles and various parts of the tympanum,—a diseased condition by far the most frequent in the 120 dissections? Could a rigid condition of the chain of bones, or ankylosis of the stapes, be relieved by it? I do not believe that even a thickened state of the mucous membrane of the tympanum would be relieved in the most remote degree; for, in the sixth series of Researches into the Pathology of the Ear now before the Medico-Chirurgical Society, one of the results of between 1,500 and 1,600 dissections is to show, that, even in cases of co-existing hypertrophy of the mucous membrane of the fauces and tympanum, the lining membrane of the inner half of the Eustachian tube remains quite healthy; I have seen at least one case in which, during scarlet fever, the mucous membranes of the fauces and tympanum were both ulcerated, and yet the principal part of the lining membrane of the Eustachian tube, that which is wholly protected, was healthy. In this second class of cases, it is evident, that the operation of excision of the tonsils could, therefore, have been of no benefit, and temporary improvement in any case has, doubtless, arisen from the excitement of the nervous system. That such operations have been followed by an aggravation of the deafness, my own experience, corroborated by that of Mr. Harvey, fully testifies.

*Thirdly, Mr. Yearsley advocates the excision of the Uvula in cases of deafness.*

He says:<sup>1</sup>—"Guided by a sound and wholesome experience, I have not hesitated, in certain cases of deafness, to remove the uvula;" and, at page 20, adds:—"Irritation of the uvula, as I have explained in a former section, often spreads from the uvula to the ear, through the Eustachian

<sup>1</sup> Loc. Cit., page 14.

tubes, by continuity of surface; but I am also persuaded, by extensive observation, that an irritable uvula frequently deranges the organ of hearing by purely sympathetic irritation of the ear. I have seen many cases in which *tinnitus aurium* was manifestly excited in this manner.”<sup>1</sup> The only ground for this operation which I have been able to meet with in Mr. Yearsley’s brochure, is the fact cited in the paragraph preceding the above, that, “in the operation for the removal of an elongated uvula, patients frequently cry out, from the severe pain caused within the ear, though little is felt at the point of excision.”

*Fourthly, Mr. Yearsley advocates the excision of a portion of the Soft Palate in cases of deafness.*

He says, at page 7:—“There is yet another *probable* cause of mechanical obstruction of the mouth of the Eustachian tube, occurring in persons of middle and advanced life—persons who have suffered much from dyspepsia as the result of improprieties of diet, from mental anxiety, or from general debility. In these cases, a relaxed condition of the mucous membrane of the throat is observable. It is seen hanging loose and flabby, and, as it were, in folds. Here I have *sometimes suspected an overlapping of the mouths of the Eustachian tubes by the loose mucous membrane*; and the results of treatment have occasionally justified the opinion I had formed, for, shortly after excision of a small slip of mucous membrane from underneath the arches of the palate, amendment more or less considerable has taken place.”

Such, then, are the four classes of cases in which Mr. Yearsley advocates excision of the tonsils, uvula, and portions of the soft palate, in the treatment of deafness. I think it may be fairly asserted, that, even in the first class of cases, he has not made out any just grounds for the performance of the operation; and, in reference to the three succeeding classes, he has not adduced even the shadow of evidence which will convince the profession that these operations are to be tolerated; that, on the contrary, they are opposed to every rational and scientific principle which should guide a surgeon in the performance of an operation, must, I think, be manifest even to a tyro in medicine.<sup>2</sup>

<sup>1</sup> Not a single fact in proof of these several assertions is ever adduced.

<sup>2</sup> I have not deemed it requisite to say a single word in proof of the entire absence of all reasonable ground for the excision of the uvula and portions of the palate. I have thought the above quotations in favour of these operations a sufficient condemnation of them.



But these operations become utterly unjustifiable when the extent to which they are performed, and the evils which result from them, are fully appreciated. I can say, from my own experience, that they have been performed in every possible variety of deafness, from cases where the disease has evidently been in the brain or labyrinth, where the nervous system of the ear has partaken of the general debility of the system, down to those of hypertrophy of the membrana tympani. Indeed, it was only requisite for a patient to be deaf, to secure the excision of his tonsils, or some part, at least, of his throat, being cut. And what has been the result of these operations? In the first place, I have no hesitation in stating, that my own experience agrees with that of Mr. Harvey, and that many cases of deafness have been much increased by them. Mr. H. says:<sup>1</sup>—"Some thousand operations have been performed on man and woman, the greater number seemingly without a reason or excuse. The profession is entitled, surely, to be made acquainted with the results—results which, I fear, when known, will be found to be, though remote, not the less melancholy." In the previous page, Mr. H. says:—"Such excision (of the tonsils) is by no means calculated to afford relief to defective audition; nay, more, it is more likely to prove injurious, in many cases, than serviceable. The same experience has satisfied me that the removal of the tonsils gives rise occasionally to deafness;<sup>2</sup> that it enfeebles the frame, injures the constitution, affects the system in general, and alters the nutrition of the body." But the local injury is not confined to the ear. I have met with many cases; and some of these, I regret to add, have occurred in professional singers, whose voices have been completely ruined by them. Even while writing this paper, a celebrated physician mentioned to me a case of the kind. He said: "Miss A., a professional singer, was induced to submit to the operation; I would not assent; I endeavoured to dissuade her from going, and refused to accompany her; the tonsils were excised, and she has never sung since." The voices of some patients have been so much injured by the operation, that they have never been able to read aloud afterwards; the ordinary voice has been weakened, a difficulty of swallowing has been experienced, and there has ever remained

<sup>1</sup> Loc. Cit., page 33.

<sup>2</sup> This fact may be accounted for from the insertions of the muscles which open the Eustachian tube, the tensor and levator palati, being affected by the operation.

a sense of dryness in the mouth and throat, accompanied by thirst.

A *second* way in which the excision of the tonsils acts injuriously is by deranging the general health. In addition to their local influence upon the mouth and fauces, the tonsils seem to have some intimate relation with other organs, especially in woman. I have seen numerous instances in which the patients have dated the origin of a general debility, with its various accompaniments, to the extirpation of their tonsils. Indeed, the day in which the tonsils have been extirpated has been mentioned to me by several as one of the bitterest in their lives. Here is another corroborative case from Mr. Harvey:<sup>1</sup>—"A young lady, about eighteen years of age, had the tonsils removed for apparent obstruction, as well as for some thickness of the voice; she was of a ruddy complexion, and the mammæ were developed. A few days after the operation, her health became deranged; her bosom sank, and great disturbance was complained of in the other functions. Here there can be no doubt of the close connexion between the mammary gland and the tonsils. My friend Mr. Hunt detailed to me the particulars of a case of a young lady, whose health sympathised in a similar way with the excision of the tonsils." Mr. Harvey also says:<sup>2</sup>—"The result of my observation and experience is, that excision of the tonsils has also produced considerable disturbance in the pulmonary apparatus, both in the mucous membrane of the bronchi, and in the parenchyma of the lung itself." I myself have frequently seen cases in which a pulmonary affection has dated from the extirpation of the tonsils; and I do not hesitate to say, that there is scarcely a medical man of large practice who could not add his testimony to the fact of the injury, local or general, which has accrued to patients from tonsil-cutting, and other operations on the throat.

I cite the following cases, in illustration of the evil effects of excision of the tonsils, out of the many that have fallen under my notice:—

Miss W., aged 26, of a weakly constitution, consulted me a short time since on account of deafness. She says that her mother was deaf, and two of her cousins are so. Eight years ago, after a severe cold and pain in the ears, she became dull of hearing, and the affection gradually increased. She requires to be spoken to through an elastic tube. She complains of a loud rushing noise, which comes on suddenly in an

<sup>1</sup> Loc. Cit., page 28.

<sup>2</sup> Ibid., page 31.



aggravated form whenever she is excited. She is also more deaf when she is weak. On examination, each meatus and membrana tympani was found in a healthy state, and the Eustachian tubes pervious. This lady stated, that a few years previously she had consulted a gentleman on account of her deafness, and that upon looking into her throat he at once said, "I must cut out your tonsils; that will certainly cure you." The lady's aunt slightly expostulated. However, the gentleman at once proceeded to perform the operation, and, after several unsuccessful attempts to lay hold of the tonsils, he at last managed to get them both out, the parts removed being about the size of a small almond. This lady's report is, that "since the removal of the tonsils the deafness has seriously increased, that her voice has been so weak that she has been seldom able to read aloud, and then never for more than a quarter of an hour at a time, which she considers a very severe deprivation." Although she previously had a very fine voice, "she is now disabled from singing, has frequent pain in the fauces, a constant sense of dryness in the mouth, and thirst." Her general health has also materially suffered, and she is now under the care of a celebrated physician-accoucheur in London. Upon looking into this patient's throat, there was no vestige of the tonsils. Dr. Copland, who saw this case with me, said "the operation was quite unjustifiable; that organs had been cut away which exercised very important functions in the animal economy." Dr. Copland added in a note to me, that he "considered these operations of cutting off the tonsils and uvula more or less injurious, and that he never knew a person who could sing, to preserve the voice afterwards; dryness of the throat and hoarseness being generally complained of."

Another young lady, about the same age, and who was under my care, thus writes to me:—"The first time I paid the gentleman a visit, he said decidedly the tonsils ought to be removed, and expressed some surprise that they had been allowed to remain so long. He assured me, very positively, that their removal would cure the deafness, which, he said, was solely caused by their enlargement, and also attributed a very frequent sore throat, I was at that time subject to, to these same unfortunate tonsils; though now that I am better acquainted with the nature of enlarged tonsils, I believe mine to have been most innocent, and not in any way to be blamed for my infirmities; they certainly never inconvenienced me, and, when removed, were not larger than the end of the little finger. The gentleman removed them the second visit I paid

him, and just before doing so, told me not to be surprised if the cure was not immediate, as it might be some weeks. The day after the operation, the throat became ulcerated on both sides, and very much swollen, and remained so for a week or ten days, and it was with great difficulty that I could swallow even liquids in very small quantities; he said, I must have taken cold. In the frequent visits I paid him afterwards, he always put caustic to the throat, stuffing a sponge which contained it as far down as possible. The first time, it gave me intense spasm to an extent I hope never to have again; it frequently had the same effect afterwards, but in a milder form, and always made the throat very sore for a day or two." This patient, who was brought to me by Sir John Liddell, had partial anchylosis of the stapes to the fenestra ovalis. I need not say, that she was not in the slightest degree benefited by the operation; but it was the opinion of her mother and others, that her health was seriously affected by it. She has lately been a great sufferer, and confined to her room for some months with an affection of the chest.

It is possible that some of my readers may think that I have laid too much stress upon the injurious results which have followed the excision of the tonsils, and other operations upon the throat. From the large number of cases I have met with in my own practice—from the numerous cases detailed to me by others—from the attempts made by medical men, especially by the late Mr. Liston, to put a stop to the operation, and from the fact that 3,000 operations have been performed by one gentleman alone, I do not think I have magnified the extent of their evil effects. That they must have been keenly felt by society, is shown by the fact, that one of the most popular of modern poets, who did not raise his voice without due cause, thought it his duty to aim the lash of his satire at these operations of "tonsil-cutting," as well as at the system of unceasingly injecting the Eustachian tubes.<sup>1</sup>

<sup>1</sup> Thomas Hood, "Poems of Wit and Humour," page 17. Moxon, 1852.

## APPENDIX.

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Several writers have alluded to the beneficial results following the treatment of a perforate membrana tympani by means of the introduction of foreign bodies, especially of lint and cotton wool. Thus Itard cites a case in which the deafness was completely relieved by the introduction of a portion of cotton wool to the bottom of the meatus. Deleau speaks of a patient who greatly improved his hearing by the introduction of a piece of wood or the central part of an onion. Mr. Tod describes "the relief derived from the mere introduction of a little lint into the external meatus, in those cases where the membrana tympani has been ruptured or destroyed by disease. So great, indeed, is the improvement which takes place from the application of this simple remedy that patients will frequently appear astonished on being so easily relieved."<sup>1</sup> In the year 1848, Mr. Yearsley published a pamphlet entitled "On a new mode of treating Deafness when attended by partial or entire loss of the membrana tympani; associated or not with discharge from the ear." In this pamphlet, he advocates the application of cotton wool in a moistened state, in cases of partial or entire loss of the membrana tympani, the object of this substance being, as he has subsequently stated, "to support the remaining portion of the membrana tympani, or the ossicula."—*Provincial Medical and Surgical Journal*, August 18, 1852.—With respect to the mode of applying the wool, the following are his instructions:—"A small piece of wool differing in size according to the case, and fully moistened in water, is introduced through the speculum to the bottom of the meatus, and adjusted superiorly, inferiorly, anteriorly, or posteriorly, according to the situation of the perforation, and other circumstances connected with the case; but care must be taken that the entire opening be not covered, otherwise the experiment will not succeed. It is also indispensable to success that the moisture of the wool should be preserved." He also says, "It is far from my wish to discourage the attempts of others to place aright 'these magical bits of wool,' but truth compels me to add that, simple as it may appear, it is an operation requiring the most delicate tact to manipulate with success, which great experience only can confer."

In all cases of perforate membrana tympani, where the introduction of a foreign substance is productive of benefit, I believe it will eventually be proved that such benefit is the result of a partial or complete closure of the orifice.

<sup>1</sup> Anatomy and Physiology of the Organ of Hearing, pages 105-6. 1852.



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